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## REVIEWS

**MacDougal's Elementary Plant Physiology \***

Dr. MacDougal's new elementary text-book of plant physiology is logically a revised edition of his *Experimental Plant Physiology*

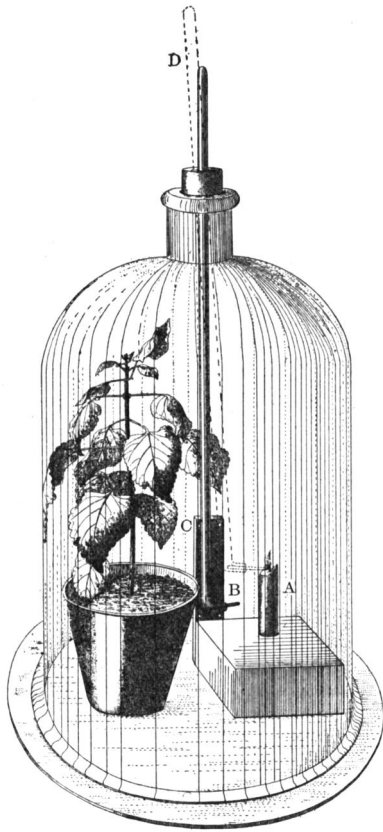


FIG. 64: Apparatus for demonstration of relation of plants to atmosphere. *A*, candle. *B*, match held in end of bent glass rod. *C*, sanded paper. *D*, position of glass rod when match is applied to candle.

gain self-reliance in performing the experiments, and by observation

brought out in 1895, but a consideration of its contents shows that it is in fact a new book differing widely both in method of treatment and arrangement of subject matter from the earlier text. It is also to be said that the new book is an elementary manual adapted to the needs of sub-collegiate grades and that in method of attack and sequence of the subject matter it is altogether different from the advanced text-book by the same author. The program of the contents is as follows: Chapter I. Introductory. II. Growth. III. Reproduction and Germination. IV. Exchanges and Movements of Liquids and Gases. V. Nutrition. VI. Respiration, Digestion and Fermentation. VII. Stimulation and Correlation.

These features are clearly presented by text, illustration and experiment. The text is so arranged that the student must

\* MacDougal, D. T. *Elementary Plant Physiology*. 8vo. Pp. i-xi + 138. London and New York, Longmans, Green and Co. 1902. \$1.20.

and reasoning draw his own conclusions regarding the functions of organs and their adjustment to environment. The suggestions and appliances for conducting the various experiments will be found highly satisfactory. While the experiments are simple and easily prepared, attention is directed to the performance of each demonstration and to the proper construction of the apparatus. The author's device for the demonstration of the evolution of oxygen by green plants in sunlight and the relations of the plant to the air, as shown in Fig. 64, is a typical demonstration, and illustrates the author's care in the manipulations, and in setting forth scientifically complete experiments.

One of the most commendable features of the book is the continued emphasis given the more manifest structures and functions. The plant is constantly treated as a living organism responsive to the forces playing upon it and always showing a purposeful reaction. This feature is worthy of more than passing commendation. It not unfrequently happens that the student loses sight of the nature of the reaction in the stress laid upon its exact measurement by ordinary methods, and the efficiency of elementary courses is frequently seriously interfered with by the mathematical exactness required in the prosecution of the work.

It seems to us that the author is very happy in the introductory portion of the subject by the consideration of growth. While this procedure may violate the logical arrangement of the subject yet it plunges the student at once in the first day of his course into a series of observations and experiments easily made which are sure to awaken the keenest interest. It is, in fact, immaterial for the time being, whether he may be acquainted with the intimate structure of the growing organs or not. Ample opportunity for acquiring such information soon follows. The advantage derived from giving the student a chance to gain some accurate information of his own at first hand upon a familiar phase of the activity of the plant is obvious and the training received will enable him to appreciate better what might be termed the more fundamental portions of the subject in the work that follows.

C. C. CURTIS.